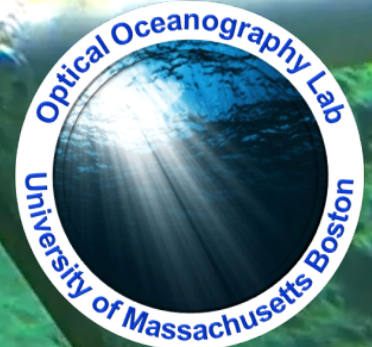


Evaluation and Application of the AVIRIS Data for the Study of Coral Reefs

Zhongping Lee, Jianwei Wei



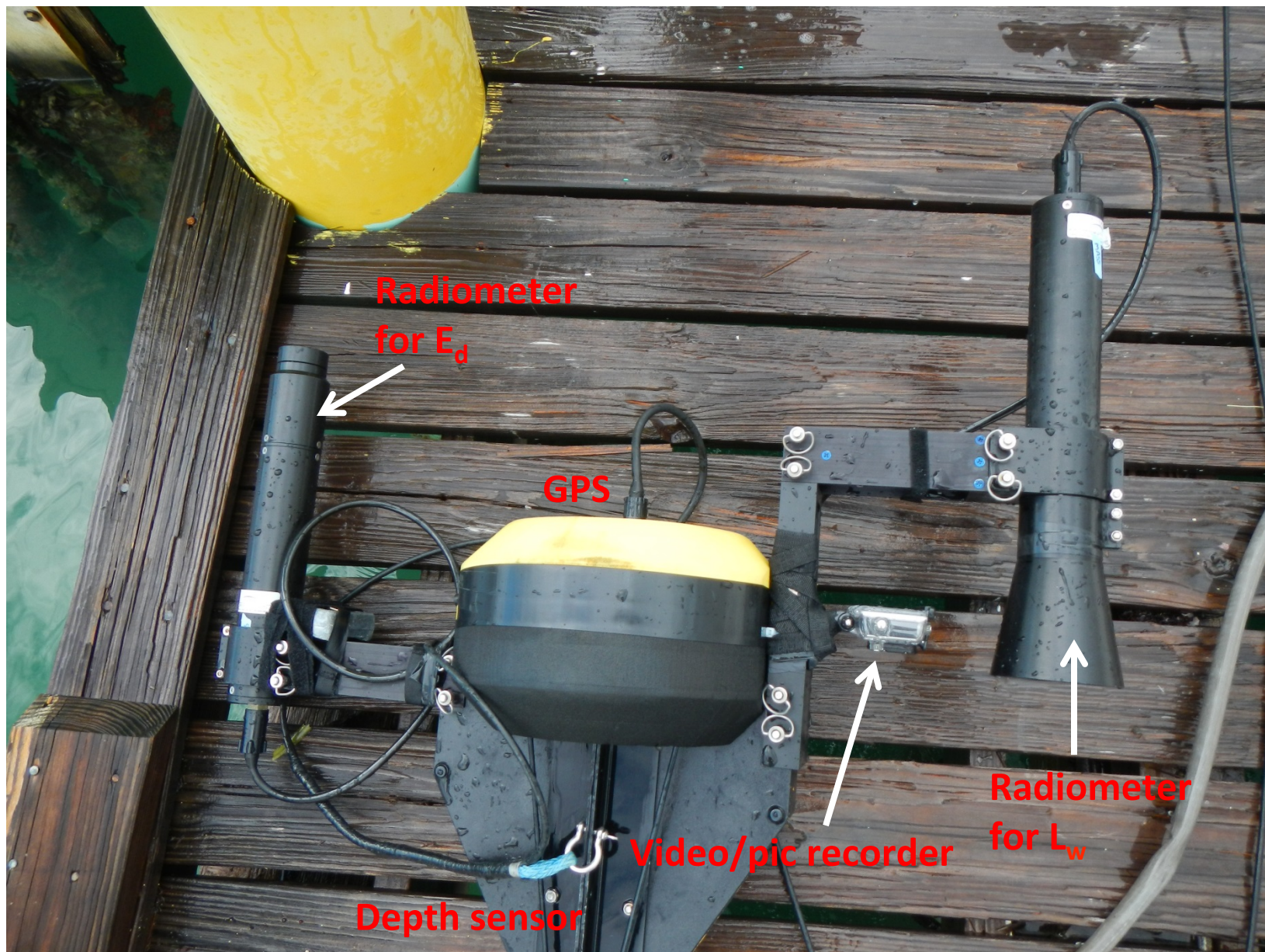
Acknowledgements:

**NASA HyspIRI Coral Reef and
Volcano Research Program**

Objective:

evaluate the quality of the remote-sensing reflectance (R_{rs}) derived from the new AVIRIS

- Evaluate and refine remote sensing algorithms developed for the detection of live corals;
- Obtain live coral coverage of the overflight regions from both video sampling and *in situ* R_{rs} with the most robust algorithm;
- Map live coral coverage of areas covered by the AVIRIS flight line with the robust algorithm after gain confidence of the AVIRIS R_{rs} ;
- Assess the impact of 30-m footprint on the detection and mapping of shallow-water coral reefs;
- Evaluate the relationship between live coral coverage and light availability



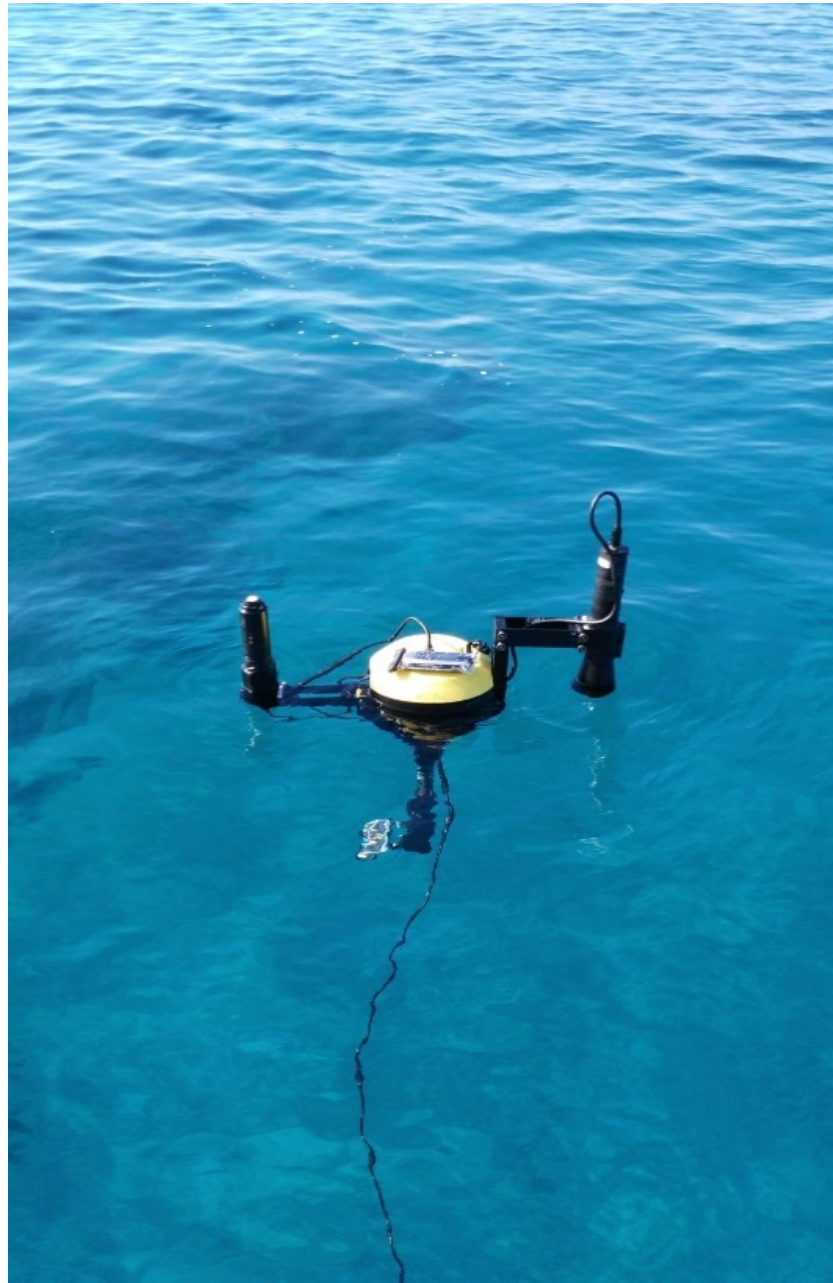
Radiometer
for E_d

GPS

Video/pic recorder

Depth sensor

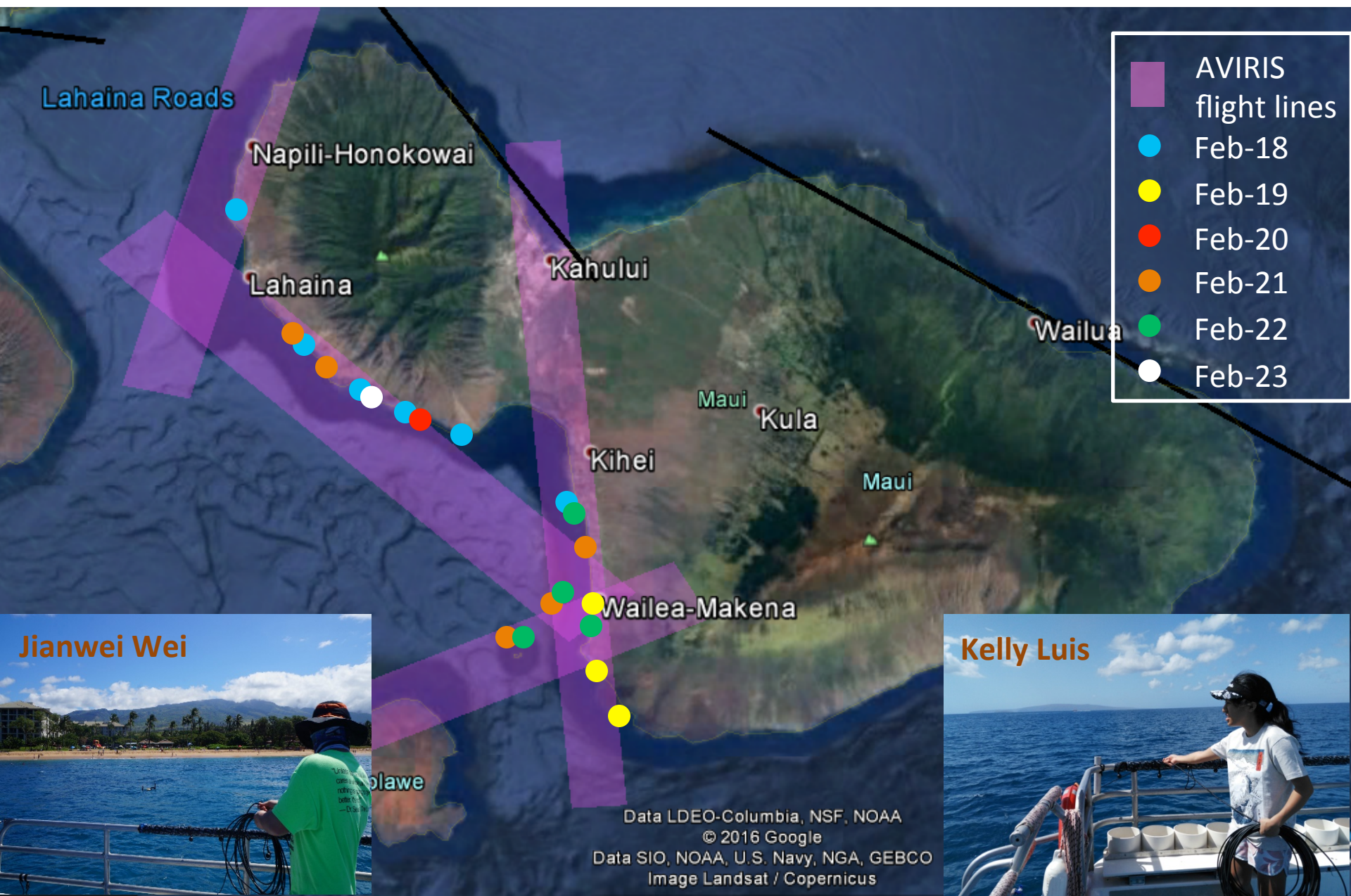
Radiometer
for L_w



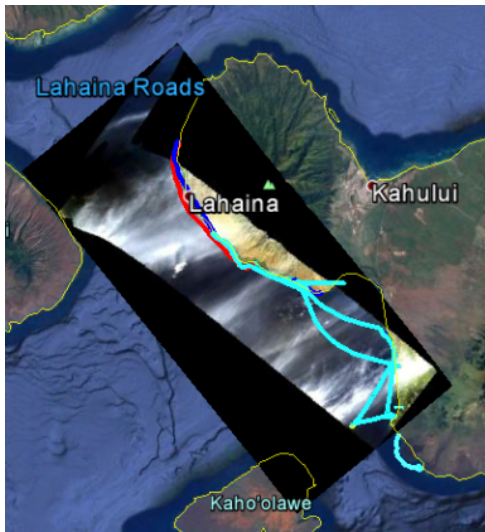
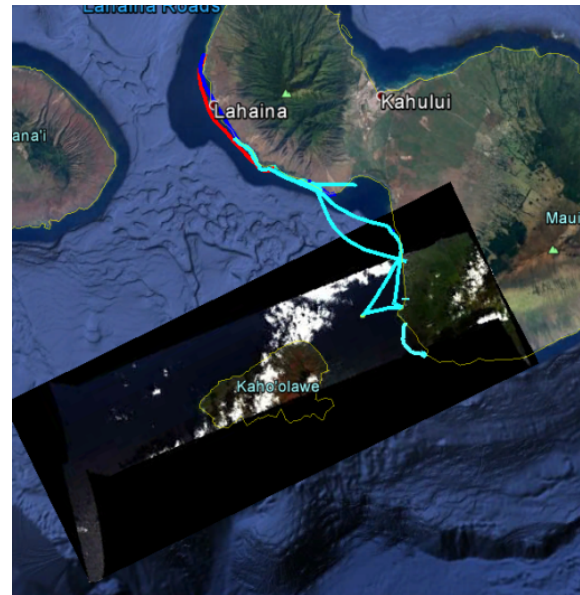
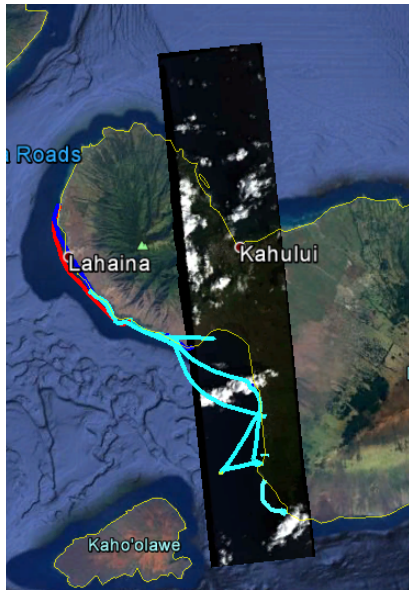
NASA HypIRI Feb 2017 Hawaii Flights



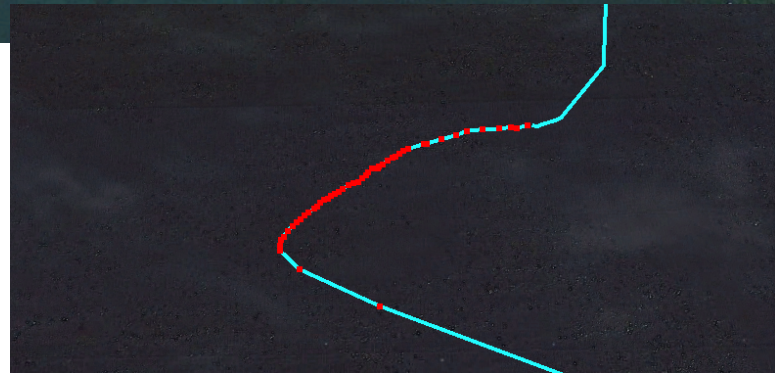
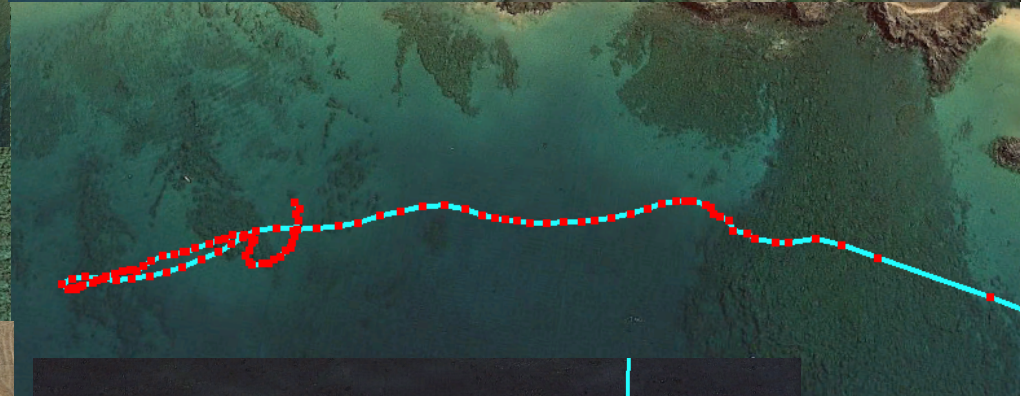
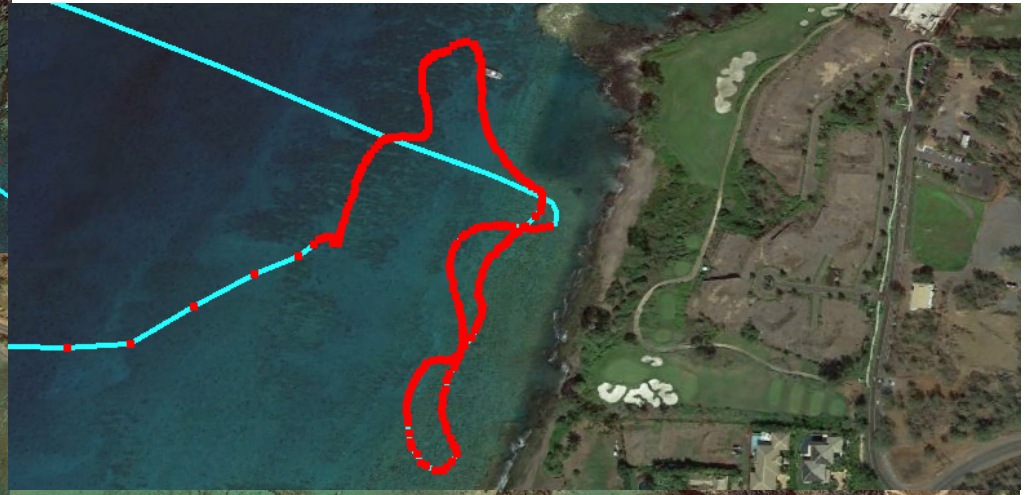
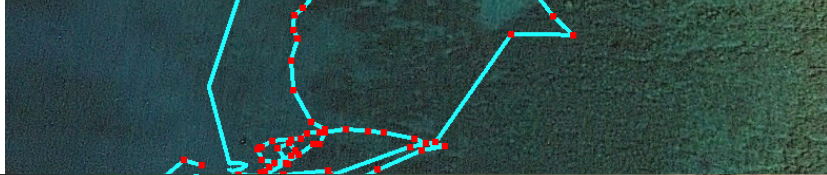
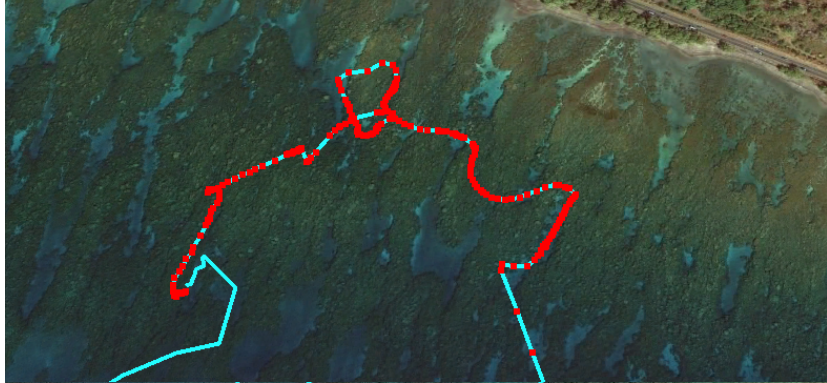
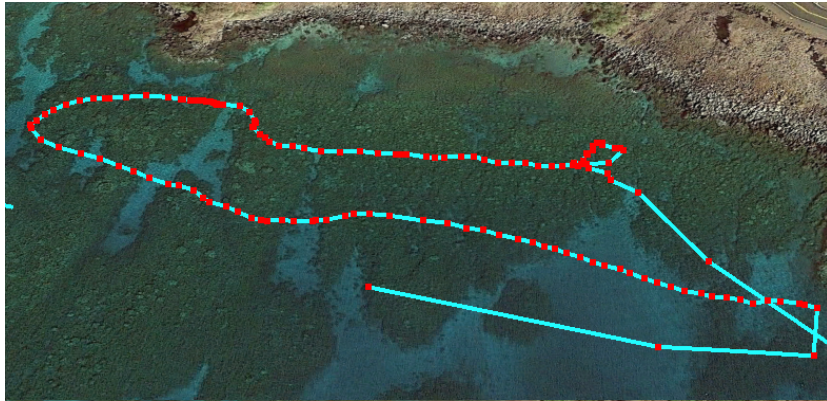
2017 In-situ Optical Observations in Maui



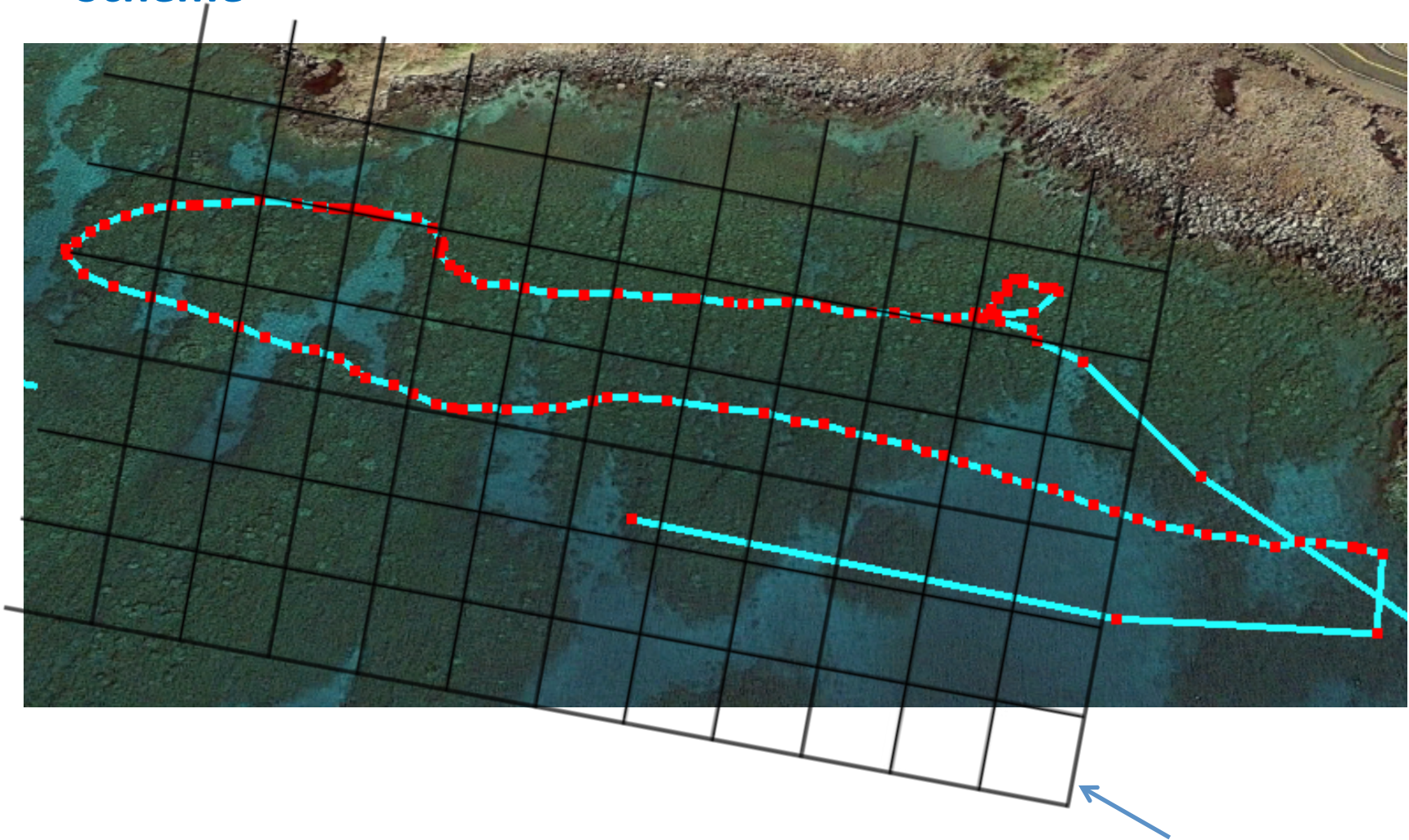
2017 In-situ Optical Observations in Maui



Mapping various bottom substrates (and deep waters)

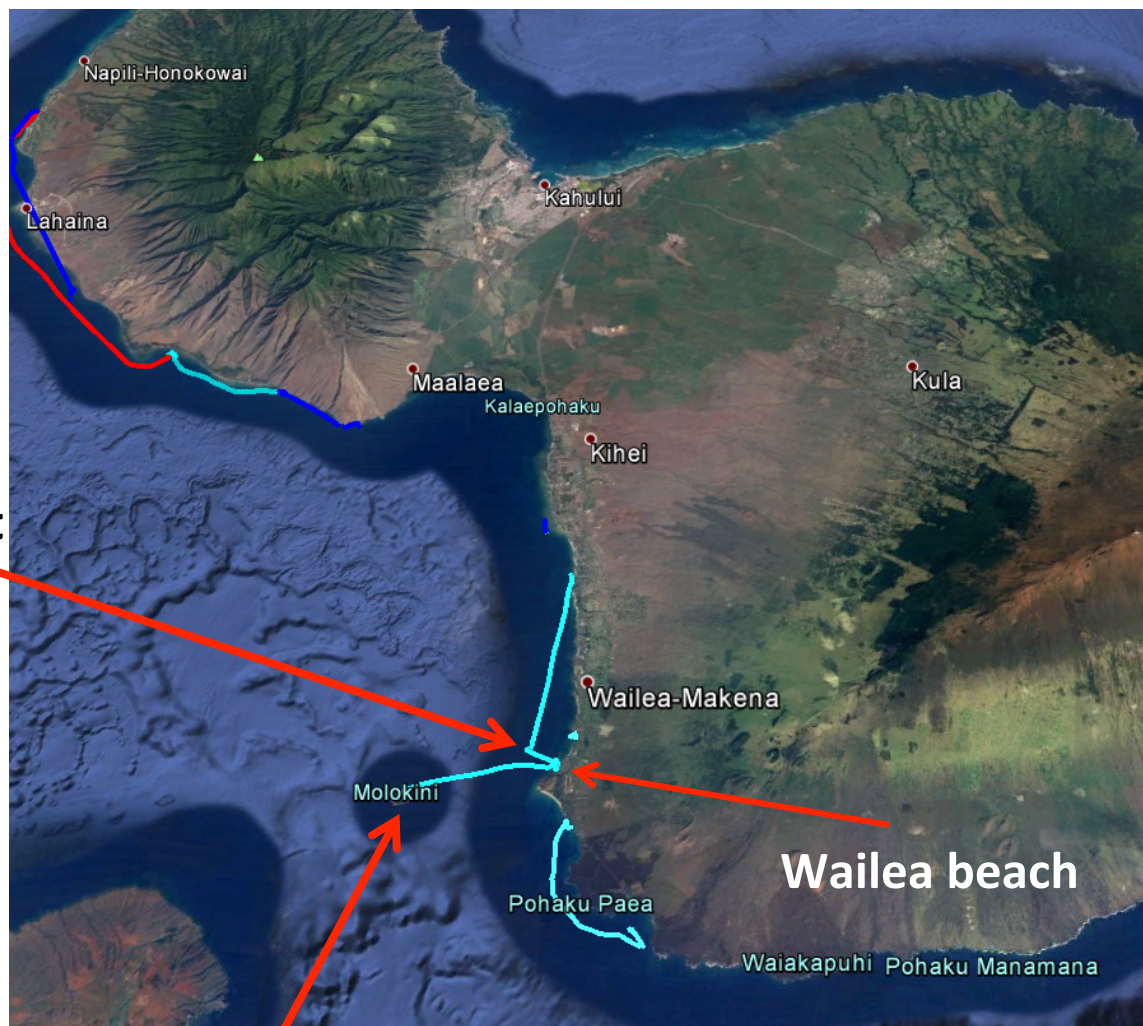


AVIRIS Remote Sensing Data Evaluation Scheme

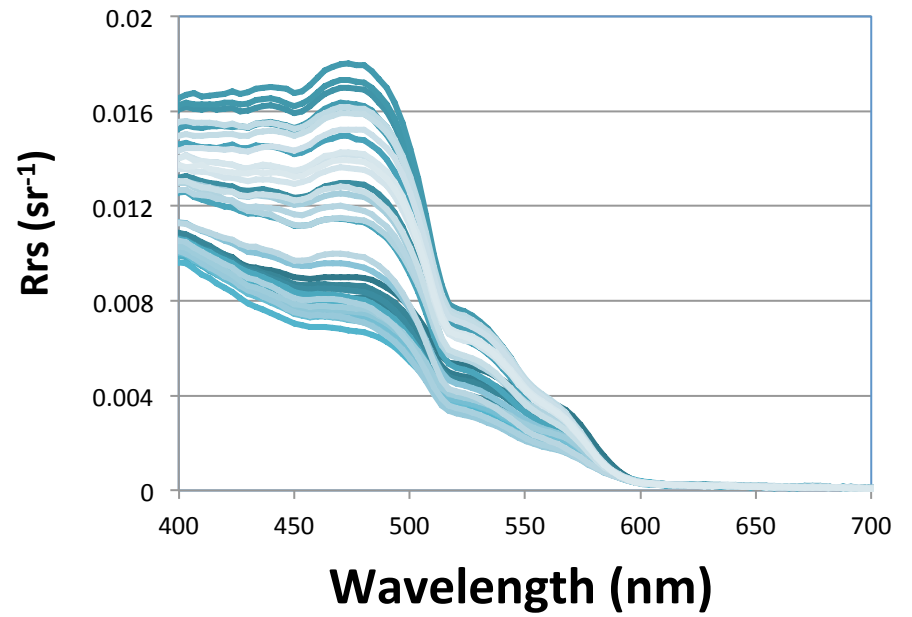


AVIRIS image pixels
(~15 m)

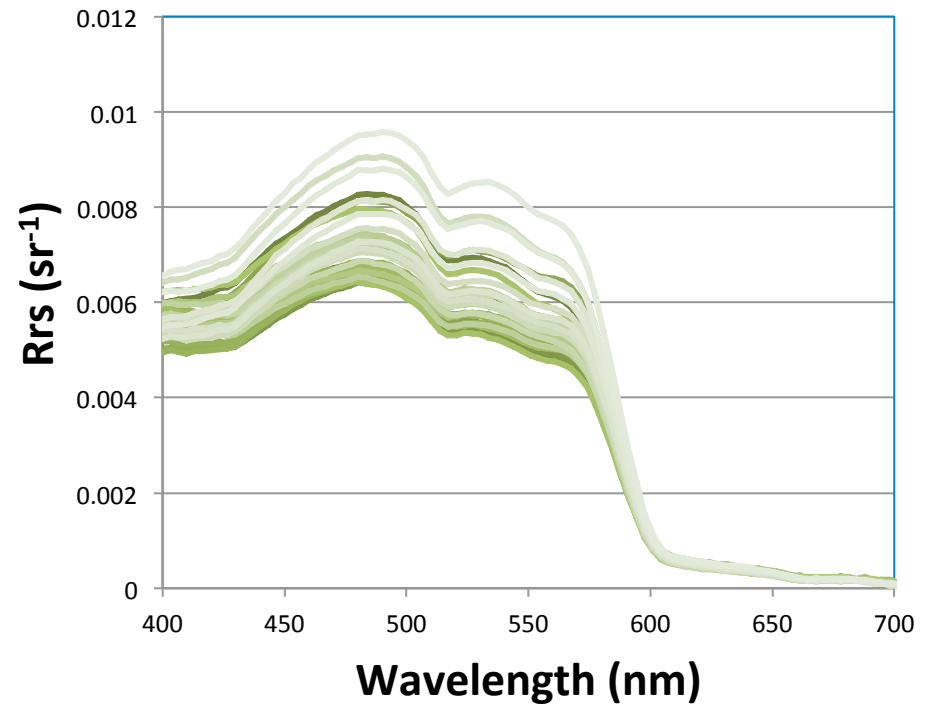
**Deep water
measurement**



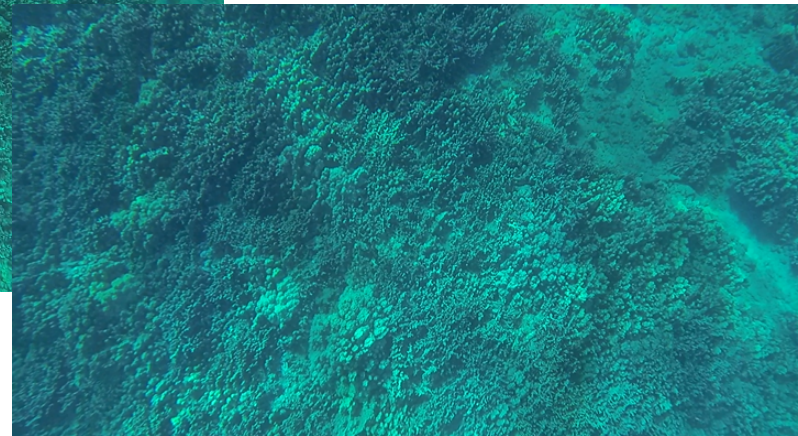
Molokini Atoll

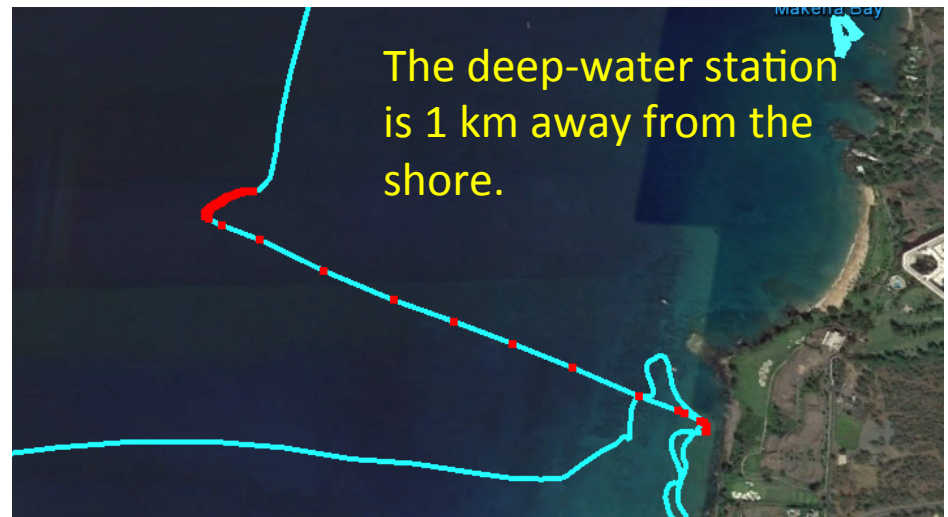
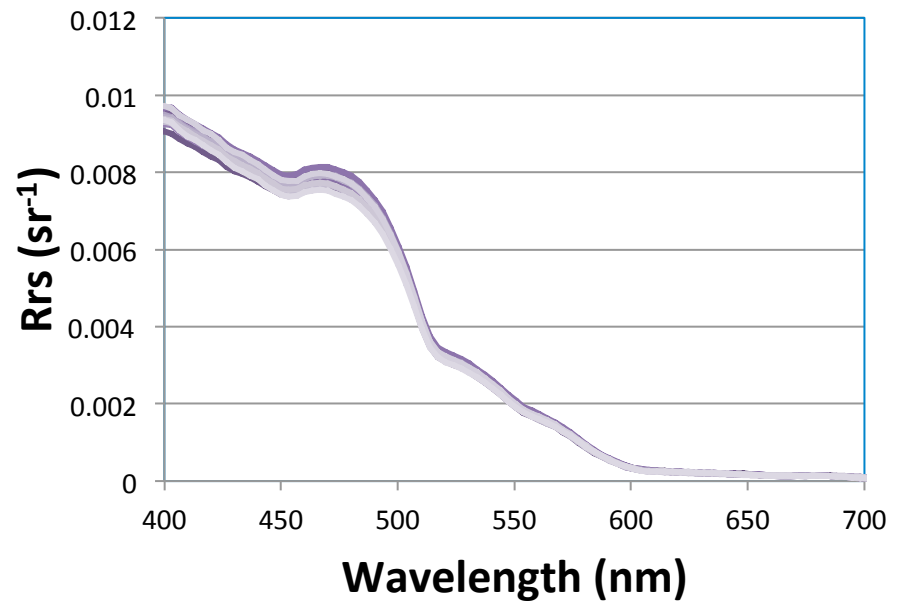


(1) Molokini Atoll



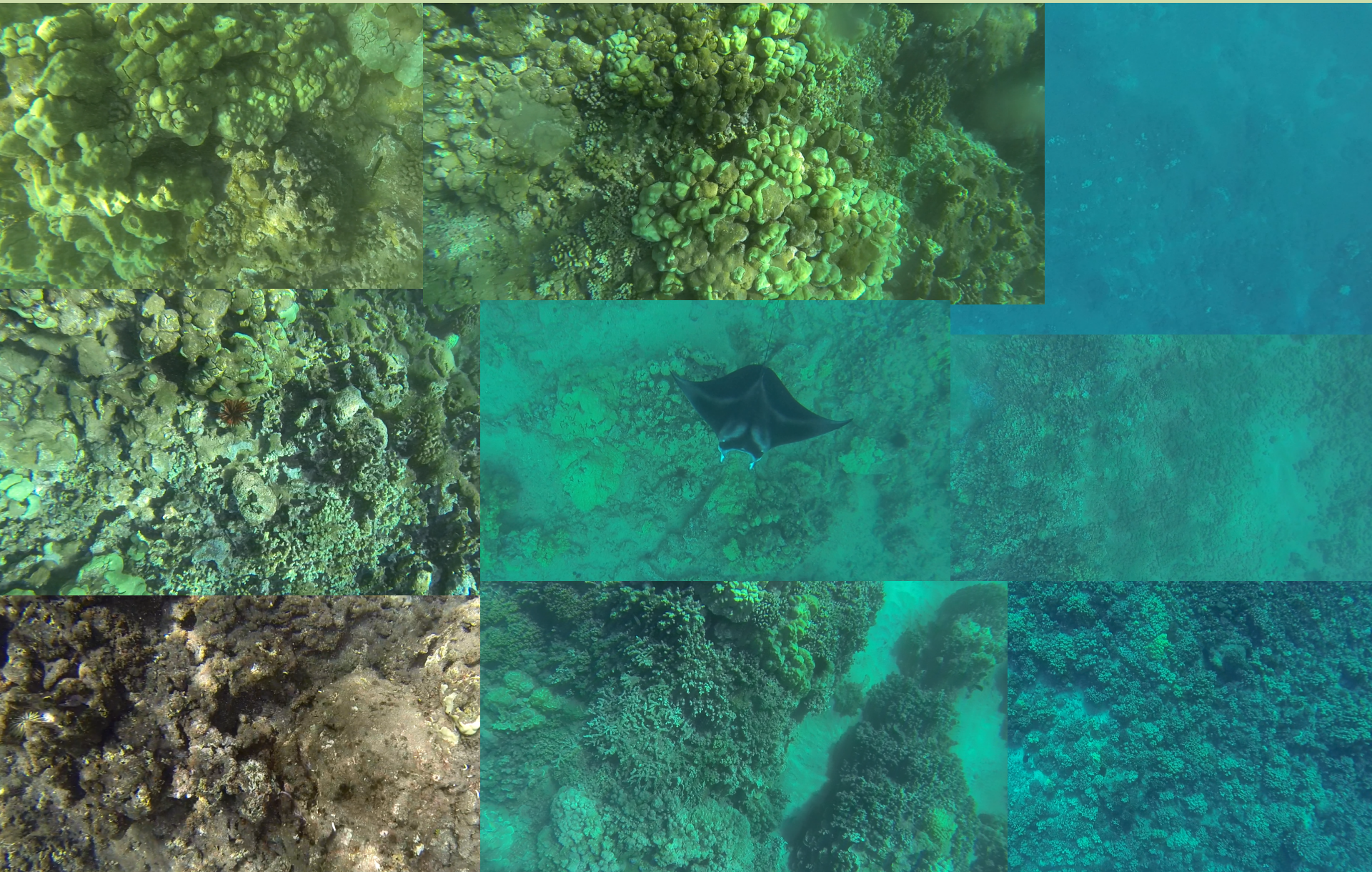
(2) Wailea beach





(3) Deep waters

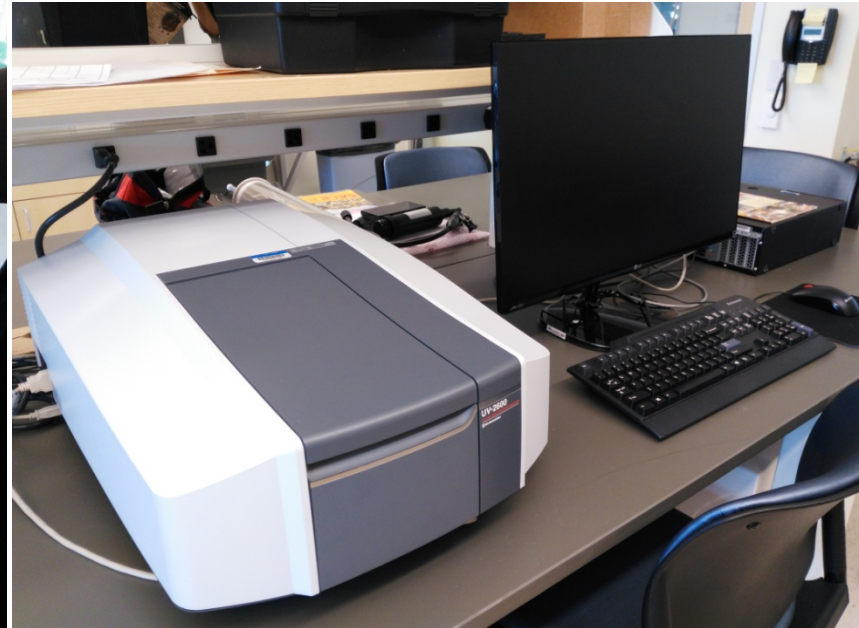
At each transect (depths of 2-15 m), benthic videos (24 fps) were captured to facilitate further analysis.



Water samples were also filtered to measure the light absorption properties of particles



- 1) Phytoplankton absorption
- 2) Detritus absorption
- 3) Total particle absorption

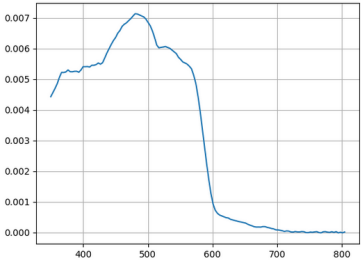



VISA (Visualization of InSitu data)

+

-

id: 91
Time: 2017-02-23T05:46:18.000Z
Type: Rrs
Depth: null
Owner: Zhongping Lee





☐ Select

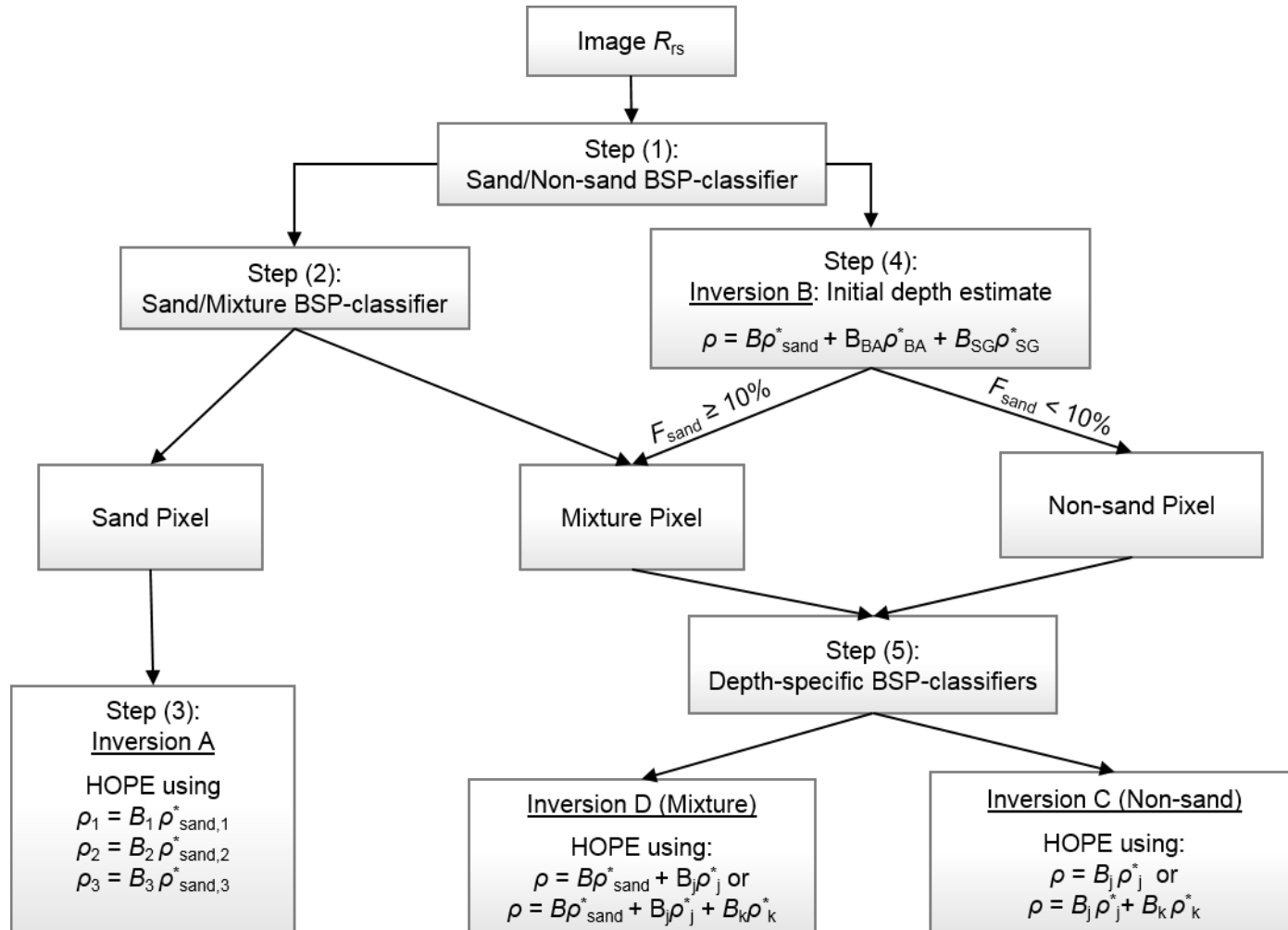
Date From
12/31/1969

Date To
10/16/2243

<input type="checkbox"/>	↑ id	Timestamp (UTC)	Latitude	Longitude	Depth	DataType	Owner
<input type="checkbox"/>	44	Jun 15, 2016 12:27:45 AM	21.46260	-157.79400	2.0	Rrs	Zhongping Lee

Leaflet

Algorithm to Remote Sense Bottom Substrates



Summary:

1. Successful field measurements to support AVIRIS overflight
2. Wide range of “end members” for the spectral reflectance of various bottom substrates
3. Data analyses are on-going, and a prototype algorithm has been developed for the remote sensing of bottom substrates.

Thank you!